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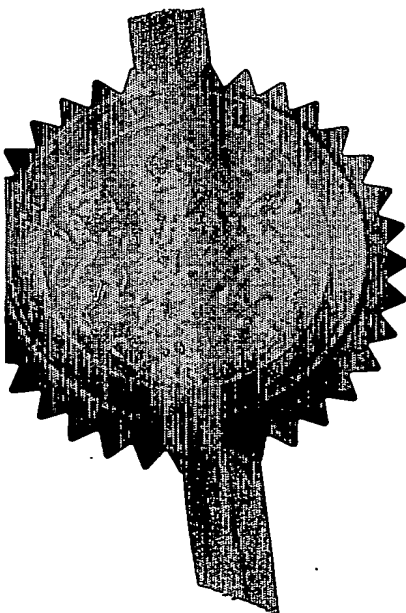
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Signed

Stephen Hordley

Dated

2 July 2003

18 JUN 2002

NEWPORT

The
Patent
Office18 JUN 02 E7/6549-7 000339
P01/7400 0.00-0213949.1**Request for grant of a patent***(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)*

18 JUN 2002

The Patent Office

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- | | | | |
|----|--|---|--|
| 1. | Your reference | JDM/DGR/P407377GB | |
| 2. | Patent application number
<i>(The Patent Office will fill in this part)</i> | 0213949.1 | |
| 3. | Full name, address and postcode of the or of each applicant (<i>underline all surnames</i>) | AWAZEL WATERPROOFING COMPANY.,
P.O.Box 2955,
Riyadh, 11461,
Kingdom of Saudi Arabia. | |
| | Patents ADP number (<i>if you know it</i>) | 8404659001 | |
| | If the applicant is a corporate body, give the country/state of its incorporation | KINGDOM OF SAUDIA ARABIA | |
| 4. | Title of the invention | CLEANING METHOD AND APPARATUS | |
| 5. | Name of your agent (<i>if you have one</i>) | W. P. THOMPSON & CO. | |
| | "Address for service" in the United Kingdom to which all correspondence should be sent (<i>including the postcode</i>) | Coopers Building,
Church Street,
Liverpool L1 3AB | |
| | Patents ADP number (<i>if you know it</i>) | 0000158001 ✓ | |
| 6. | If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these | Country | Priority application number
<i>(if you know it)</i> |
| | earlier applications and (<i>if you know it</i>) the or each application number | Date of filing
<i>(Day/month/year)</i> | |
| 7. | If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application | Number of earlier application | Date of filing
<i>(Day/month/year)</i> |
| 8. | Is a statement of inventorship and of right to grant of a patent required in support of this request? (<i>Answer 'yes' if:</i>
a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or) any named applicant is a corporate body.
See note (d) | YES | |

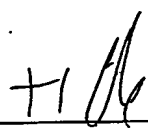
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Continuation sheets of this form

Description 5

Claims(s)

Abstract

Drawing(s) 1 + 1 

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

Request for preliminary examination and search (*Patents Form 9/77*)

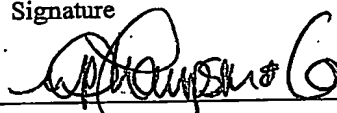
Request for substantive examination
Patents Form 10/77)

Any other documents
(Please specify)

11. I/We request the grant of a patent on the basis of this application

Signature

Date 17/06/2002



12. Name and daytime telephone number of person to contact in the United Kingdom
D.G.READ
0151-709-3961

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DESCRIPTIONCLEANING METHOD AND APPARATUS

The present invention relates to a method and apparatus for cleaning a vessel contaminated with a hydrocarbon.

Industry is reliant upon oil and its derivatives for all manner of products, uses etc. As a consequence there are vast numbers of oil producing and processing plants around the world. These plants comprise a vast number of storage tanks for crude oil or petroleum products and sludge ponds which over a period of time accumulate large amounts of sludge and therefore require cleaning from time to time to enable corrective maintenance and inspection under preventative maintenance programmes. Sludge ponds also pose a substantial environmental hazard which has to be addressed.

As a consequence, heavy sludge deposits in such tanks and ponds must be removed. These deposits can be up to several metres thick at least in part.

Existing techniques known for cleaning such contaminated vessels consist of removing such deposits using manual labour, using eg. shovels and buckets, sometimes with the aid of water under pressure. Diesel may also be used as an inexpensive softening agent.

This technique of cleaning is labour intensive, inefficient, and often results in large quantities of contaminated waste water.

It would therefore be advantageous to overcome or alleviate one or more of the problems associated with the prior art.

In accordance with a first aspect of the present invention there is provided a

method for cleaning a vessel contaminated with a sludge comprising the steps of:-

- i) generating a vacuum in a conduit.
- ii) contacting said sludge with said conduit;
- iii) extracting said sludge via said conduit; and
- iv) collecting the sludge.

Sludge typically comprises settled solids of hydrocarbons, such as asphaltenes and waxes, and inorganic solids such as sand, scale or barite. Sludge can comprise water. If asphaltenes are present with water, then water tends to be entrained in the asphaltenes which makes treatment extremely difficult by methods known in the art.

Preferably the vacuum is generated pneumatically.

Preferably the vacuum is generated by a pump.

The sludge may be heated before and/or during extraction.

The sludge may be softened before and/or during extraction with a solvent.

Such solvents comprise citrus oil extract, preferably orange oil.

In accordance with a second aspect of the present invention there is provided an apparatus for cleaning a vessel contaminated with a sludge, comprising means for generating a vacuum, a conduit connected to said means for generating a vacuum adapted to extend into the interior of the vessel from said means for generating a vacuum, and to extract the hydrocarbon and means for collecting the extracted hydrocarbon.

Preferably the means for generating a vacuum is pneumatic.

Preferably the means for generating a vacuum is a pump

The apparatus may comprise heating means for heating the hydrocarbon.

before and/or during extraction. This heating means can be created by oil, or electricity, or steam, or gas, or microwave. The heat is directed at the area to be cleaned with or without a fan, to the hydrocarbon as a whole or by section as appropriate. Preferably the heating means comprises a microwave emitter or heated oil.

Preferably this apparatus includes a suction head attached to said conduit. Preferably the heating means is bent into said head.

As an alternative to heating means in the apparatus itself, the receptacle in which the sludge is located may include heating means which may be used to heat the sludge.

The hydrocarbon is preferably heated to a temperature of 40 - 90°C, more preferably to a temperature of 65 - 75°C.

The apparatus is preferably portable.

Means for generating a vacuum, e.g. a suction pump may be operated by diesel, electricity or air, but preferably air.

The sludge extracted by the vacuuming action is directly transferred to receptacles such as, but not exclusively, drums, skips or vacuum tankers. Preferably, the sludge is transferred directly into a vacuum tanker.

The types of sludge that can be removed includes but are not limited to, the following list detailed with the acceptable viscosity ranges:

Asphalt (1400 to 2000cps, but preferably 1750 to 1850cps)

Bitumen (1000 to 1500cps but preferably 1150 to 1250cps)

Crude Oil (400 to 850cps, but preferably 600 to 700cps)

Heavy Fuel Oil.

Benefits which may result from use of the present invention include

- (a) speed of sludge removal
- (b) increased health and safety
- (c) avoidance of the conventional multiple handling of sludge, from shovels, to buckets, to larger containers and eventually to a sludge pond.
- (d) avoidance of adverse environmental impact.

A specific embodiment of the present invention will now be described with reference to the accompanying drawing, by way of example only:

Fig. 1 is a diagrammatic view of an apparatus according to the present invention.

Apparatus 10 includes a pump 12 in liquid communication with a holding tank 14. Attached to pump 12 is a flexible conduit or hose 16 which is attached at its other end to an elongate, rigid hollow cylindrical member or wand 18.

Elongate member 18 has a slightly smaller diameter than hose 16 and therefore there is an adaptor 20 to ensure that the seal between the hose and elongate member 18 is airtight.

The other end of elongate member 18 communicates with an elongate head 22 whose longitudinal axis is perpendicular to that of elongate member 18. Head 22 has an opening 24 which communicates with elongate member 18. Disposed within the head 22 and adjacent to said opening is a microwave emitter 26.

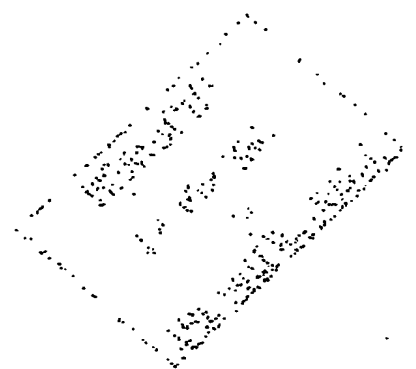
During use, pump 12 is switched on to create a vacuum or suction at the opening 24 of head 22, which is placed adjacent to the hydrocarbon in a contaminated vessel whilst at the same time microwave emitter 26 softens the hydrocarbon by

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heating it to a temperature between 65 - 75°C.

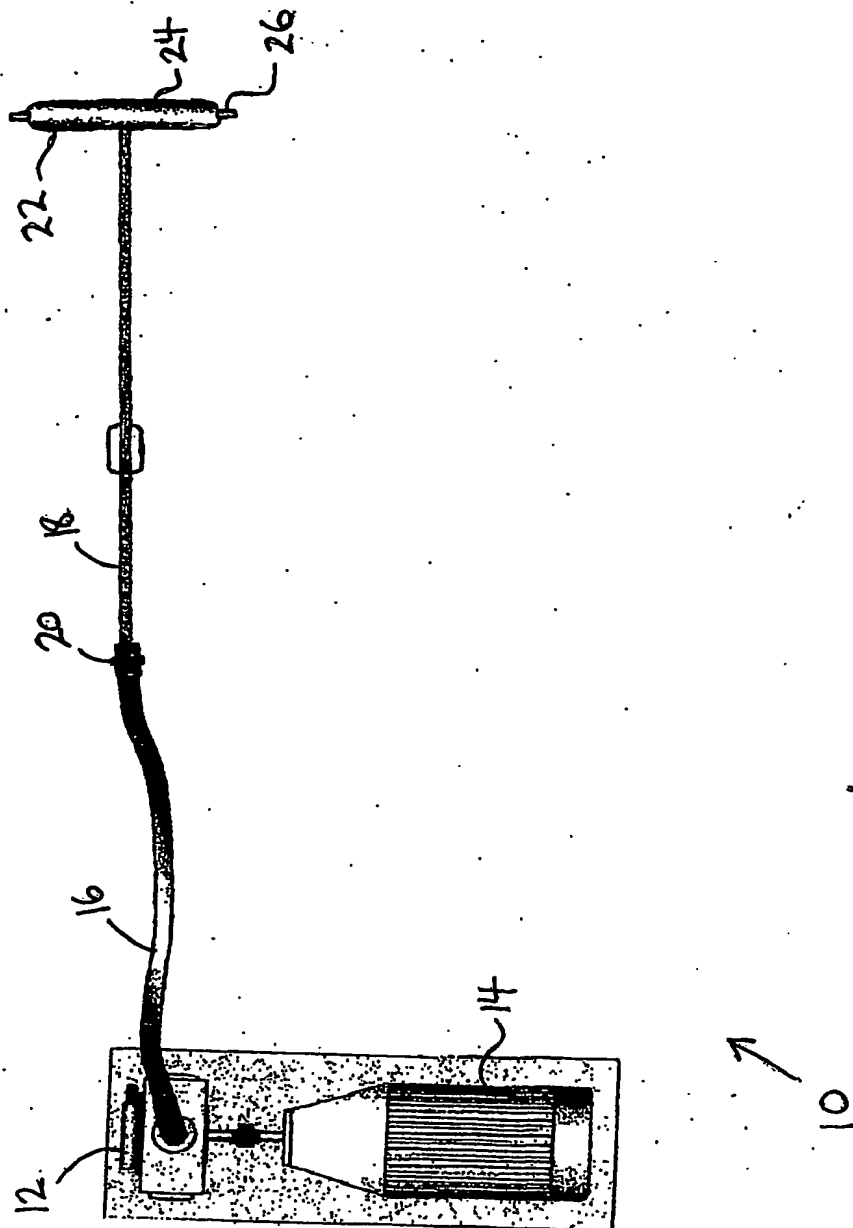
Pump 12 creates a vacuum and the hydrocarbon is extracted and conveyed along the elongate member 18 and the hose 16 to the holding tank 14.

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Figure 1



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